

REMARKS

Claims 1-8, and 21 are currently pending in the subject application, and are presently under consideration. Claims 9-20 have been withdrawn pursuant to a restriction requirement. The specification and claims 1, 5, 8, and 21 have been amended herein. A clean version of the specification and all pending claims is located at pages 2-5, and a version with markings to show changes made is located at pages 9-11 of this Reply. Favorable reconsideration of the application is requested in view of the comments and amendments made herein.

I. Rejection of Claims 1-8 and 21 Under 35 U.S.C. 112 (first paragraph)

Claims 8 and 21 stand rejected under 35 U.S.C. 112, first paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants' representative submits that this rejection should be withdrawn for at least the following reasons.

The Examiner has stated that a baffle, as recited in Claim 8, is not described in the specification. The term baffle is disclosed at page 9, line 27. Additionally, Fig.1b has been amended to show the baffle.

Furthermore, the Examiner asserts that the originally filed application and drawings fail to define the elements and/or structure corresponding to each sub-system recited by claim 21. Support for claim 21 can be found at page 5, lines 5-8 and in Fig. 1a. A first sub-system corresponds to first subsystem 20, and a second subsystem corresponds to second subsystem 20.

For at least these reasons it is believed the above claims are allowable and this rejection should be withdrawn.

II. Rejection of Claims 1-8 and 21 Under 35 U.S.C. 112 (2nd paragraph)

Claims 1-8 and 21 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. This rejection should be withdrawn for at least the following reasons.

Claim 1 has been objected to for having indefinite scope and for insufficient antecedent basis. Claim 1 has been amended herein to overcome the Examiner's objections. Specifically, claim 1 has been amended to read "at least one" rather than "one or more," and "the fluid flow" has been replaced with "a fluid flow," as suggested by the Examiner.

Claims 1 and 21 have been objected to as being incomplete. These claims have been amended herein to more clearly point out the structural cooperative relationships of elements.

Claim 8 has been objected to for clarity with respect to whether a baffle is being positively recited. Claim 8 has been amended herein to more distinctly claim the baffle.

Finally, claim 21 has been objected to by the Examiner for failure to define the elements and/or structure corresponding to each sub-system recited by claim 21. Support for claim 21 can be found at page 5, lines 5-8 and in Fig. 1a. Where a first sub-system corresponds to first sub-system 20 and a second sub-system corresponds to second subsystem 20.

For at least the aforementioned reasons, the applicants believe the above claims to be allowable and respectfully request that the objections be withdrawn.

III. Rejection of Claims 1-8 and 21 Under 35 U.S.C. 102(b)

Claims 1-8 and 21 stand rejected under 35 U.S.C. 102(b) as being anticipated by Sikes (US 5,709,262). It is respectfully submitted that this rejection should be withdrawn for at least the following reasons.

A claim is anticipated only if each and every element as set forth in the claim is found in a single prior art reference. *Verdegaal Bros. V. Union Oil Co. of California*, 814 F.2d 628, 2 USPQ2d 1051 (Fed. Cir. 1987).

Sikes fails to disclose a chamber adapted to receive at least one semiconductor substrate in fluid communication with a fluid reservoir, as recited in claim 1, and a second sub-system for contacting coated semiconductor substrates with the cooled fluid, the second sub-system being in fluid communication with the first subsystem, as recited in claim 21. Rather, Sikes merely discloses a system for cooling power supplies employed in semiconductor production processes *via* a pair of conduits between the power supply and a chiller. Accordingly, withdrawal of this rejection and allowance of independent claims 1 (and claims 2-8 which depend therefrom) and 21 is respectfully requested.

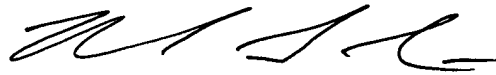
IV. Conclusion

The present application is believed to be condition for allowance in view of the amendments and comments herein. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063.

The Examiner is invited to contact applicants' undersigned representative over the telephone to expedite favorable prosecution of the subject application.

Respectfully submitted,
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

- (1) Please amend the Abstract of the Invention as follows:

Abstract of the Invention

[According to the invention, resist]Resist coated wafers are rapidly and uniformly cooled by a fluid that has been cooled through the Joule-Thompson effect. Fluid from a high pressure reservoir is vented into a chamber that contains the substrates. By varying the pressure difference between the reservoir and the chamber, the temperature of the cooling fluid entering the chamber can be controlled. By also controlling the flow rate through the chamber, the average temperature difference between the fluid in the chamber and the substrates may be limited, whereby more uniform cooling is obtained. While the chamber pressure is lower than that in the high pressure reservoir, the chamber pressure may still be substantially greater than atmospheric. An elevated chamber pressure raises the specific heat and residence time of the fluid in the chamber, which also promotes uniform cooling.

- (2) Please amend the second full paragraph at page 9, lines 20-29, as follows:

Uniform cooling of the substrate may be facilitated by keeping the average temperature of fluid in the chamber comparatively close to the substrate temperature. This slows the cooling rate, allowing time for heat to disperse evenly. Reducing the temperature difference between the fluid in the chamber and the substrates may also reduce the size of temperature differences within the cooling fluid near the substrates. To realize this latter benefit, it is preferable that cooling fluid entering the chamber does not contact the substrates immediately. Rather, it is advantageous if the entering fluid flow is directed against a wall or a baffle 290, whereby the cooling fluid entering the chamber substantially mixes with the fluid already in the chamber before contacting the substrates.

(3) Please amend the paragraph beginning at page 7, line 27, and ending at page 10, line 2, as follows:

Venting fluid into chamber 180 and exhausting it through valve 200 causes [convention]convection within chamber 180, but it may be beneficial to increase [convention]convection within chamber 180, using a fan 160 for example. Increasing [convention]convection within chamber 180 increases heat transfer between the cooling fluid and substrates 190. Thereby, the rate of cooling is increased. If convection within chamber 180 is increased without increasing the rate of flow [though] through chamber 180, uniformity of temperature within the cooling fluid increases, making the cooling process more uniform as well.

In the Claims:

Please amend the claims 1, 5, 8, and 21 as follows:

1. (Amended) A system for cooling coated semiconductor substrates, said system comprising:

a chamber adapted to receive at least one [or more] coated semiconductor substrate [substrates];

a coupling for placing the chamber in fluid communication with a fluid reservoir;

an inlet valve attached to the coupling for controlling [the]a flow of fluid between the fluid reservoir and the chamber; and

a controller [that controls] for controlling the inlet valve.

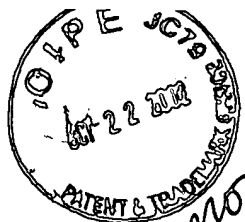
5. (Amended) The system of claim 1 further comprising an outlet valve for controlling the flow of fluid out of the chamber, wherein the controller also controls the outlet valve.

8. (Amended) The system of claim 7 further comprising a baffle, wherein the fluid flowing into the chamber is directed against [a] the baffle.

21. (Amended) A system for cooling coated semiconductor substrates, said system comprising:

a first sub-system for cooling a fluid using the Joule-Thompson effect; and

a second sub-system for contacting the coated semiconductor substrates with the cooled fluid, the second sub-system being in fluid communication with the first subsystem.



Approved.
ANC
1-3-03

Title: SYSTEM FOR RAPIDLY AND UNIFORMLY COOLING RESIST
Inventor(s): Ramkumar Subramanian, et al.
Serial No. 09/707,413
Docket No. E0794

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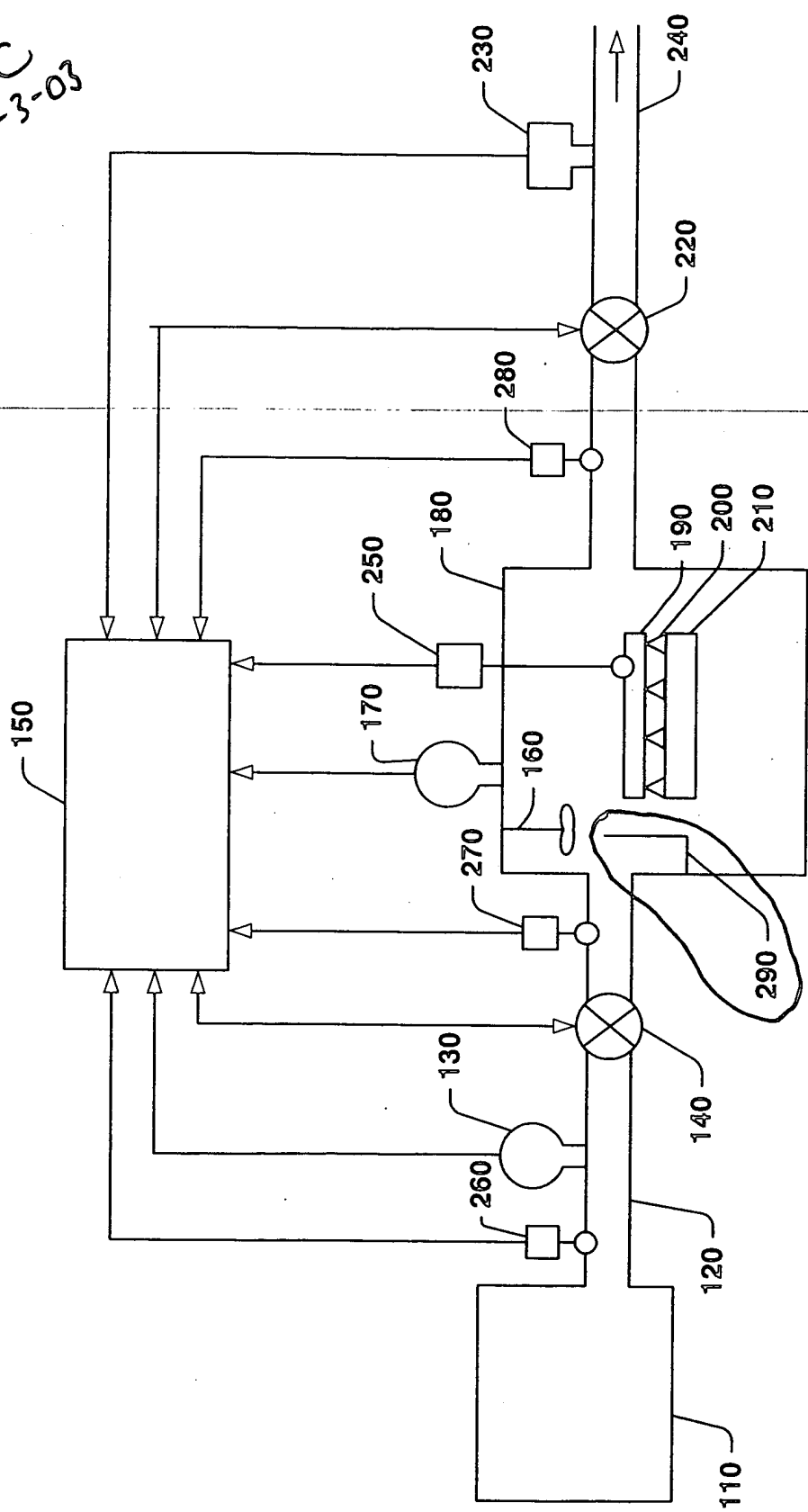


Fig. 1b